

## ABSTRACT OF THE DISCLOSURE

- An optical inspection apparatus and method is provided that utilizes both linear and nonlinear optical phenomena to detect defects. Embodiments include irradiating a portion of the surface of an article, such as a semiconductor device, with a light beam, such as a scanning
- 5 laser at an incident wavelength. The light emanating from the irradiated surface portion is then separated into light at the incident wavelength and light at one or more predetermined non-
- incident wavelengths, as by a diffraction grating, prism or filters. The light at the incident and nonincident wavelengths is sent to separate detectors, such as photomultipliers (PMT), which
- 10 respectively convert the detected linear optical phenomena (representing, e.g., surface topography) into an electrical signal, and the detected nonlinear optical phenomena, such as fluorescence, Raman scattering and/or second harmonic generation, into electrical signals
- representing, e.g., chemical composition and material interfaces. The signal from each detector is sent to a processor, which generates a defect map based on the information gleaned from both the linear and nonlinear optical phenomena.

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